

ABSTRACT

An industrially producible, highly sensitive, low power consumption, excellent temperature characteristic Hall device is provided by enabling stable provision of a quantum well compound semiconductor stacked structure having high electron mobility and sheet resistance, and excellent temperature characteristics. It has first and second compound semiconductor layers 12 and 14 composed of Sb and at least two of five elements of Al, Ga, In, As and P, and an active layer 13 composed of $\text{In}_x\text{Ga}_{1-x}\text{As}_y\text{Sb}_{1-y}$ ($0.8 \leq x \leq 1.0$, $0.8 \leq y \leq 1.0$), which are stacked. Compared with the active layer 13, the first and second compound semiconductor layers 12 and 14 each have a wider band gap, and a resistance value five times or more greater. The lattice constant differences between the active layer 13 and the first and second compound semiconductor layers 12 and 14 are each designed in a range of 0.0-1.2%, and the thickness of the active layer 13 is designed in a range of 30-100 nm to construct the compound semiconductor stacked structure.